STUDIES IN PALÆOPATHOLOGY IN EGYPT.

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(Plates V.–X.)

A word of explanation for the title of this paper is necessary.

In trying to express clearly the object of the studies which Dr. Fouquet, Dr. Elliot Smith, Dr. Wood Jones, Mr. Shattock, Dr. Ferguson, Dr. Rietti, and I have published during the last few years, I found no word exactly suitable. Hence, I coined the word "*Palæopathology.*" Palæontology is defined as "the science of extinct forms of life": by *palæopathology,* however, I do not mean the science of extinct diseases, but *the science of the diseases which can be demonstrated in human and animal remains of ancient times.* I did not adopt this term without consulting several Greek friends, notably that excellent scholar, Dr. Demetriades, who assured me that the word carried the meaning which I attributed to it.

On Pathological Lesions found in Coptic Bodies (a.d. 400–500).[2]

The bodies which I have studied were given to me by Prof. Breccia, Curator of the Alexandria Archæological Museum, and came from Antinoë in Upper Egypt. They dated from the fifth to the sixth century after Christ, and were therefore about 1400 to 1500 years old.

It is certain that most of these people were Christians, as the shirts in which they were dressed were decorated with embroideries typical of Christian times, and a beautiful Coptic cross was carved on one of the coffins.

The bodies had been originally enclosed in wooden coffins and buried in sand. Some years ago they were dug up and enclosed in rough deal coffins. When handed over to me for examination, they were dressed in the long linen shirts in which they had been buried.

[1] Received April 30, 1913.

[2] I reserve the description of microscopical pathological lesions for another paper.

From the embroideries adorning these garments, I concluded that th people had belonged to a wealthy class of the community.[1]

Remains of strong leather boots were found on some of the In one case the boots were well preserved, and reached almost to th knee. The point is interesting, as some lesions discovered in th phalanges (Plate IX. Figs. 22 and 23) might be attributed, with som probability, to the wearing of tight foot-gear.

These bodies differed considerably from the mummies of preceding periods. Never having been opened by the embalmer, the organs we *in situ*, and they contained no resin, gum, or any materials (such mud, sand, rags, saw-dust, etc.) generally used in old Egypt for packi the body, after removal of the organs. The only preservative foun and this in two cases only, was common salt. In one, a lump salt, the size of a man's fist, was lying on the abdomen, and M Lucas, of the Survey Laboratory in Cairo, pronounced it to be sodiu chloride. In another, small lumps of the same material had be scattered over the abdomen and chest.

There was nothing to show that the body had been macerated, f the skin, where no insects had penetrated, was untouched and th epidermis readily demonstrated. In one body, however, there was the lumbar region a distinct swelling, and, when opened, a lar abscess-cavity was revealed. The contents to the naked eye were gre granular, and easily removed. No cause for this abscess was d covered (Plate V. Fig. 2 *a*).

The nails, which had evidently been cleaned and cut after deat were not tied to the fingers. The hair of the head was long (Plate Fig. 1), both in males and females, and all the adult men had yellowis red beards.[2]

The penis had suffered considerable damage during the 1400 yea which had elapsed since death, so that, in most cases, I could n make sure whether it had been circumcised or not. In one case had certainly not been circumcised.

During the process of desiccation, the hands and feet had becom greatly contorted, and were often typically claw-shaped. The bon of the hands and feet, however, were found normal, except for t lesions to be described further on.

The bodies therefore could not be called mummies, in the sense which that word is generally used. They had undergone no artific process except that, at one time, they had been covered, more or l extensively, with salt. The real preservative had been the d Egyptian sand.

Unfortunately for our purpose, the hot, moist climate of Ale andria had produced evil effects on these remains. Innumeral

[1] These embroideries, now cleaned and looking almost new, are deposited in the Al andria Museum.

[2] I could not make sure whether this red colour was due to henna or not.

ulds had grown during the last two years in the acid tissues, and, casionally, the internal organs had become converted into a sticky, ue-like, black mass, with which nothing could be done; in others, wever, the organs were in a very fair state of preservation. Crystals fatty acids often covered the internal parts, especially the liver.

The *brain* was always present, not having been tampered with in cient times. As a rule, the dura mater (Plate VIII. Fig. 9) was still herent to the cranium; the falx cerebri (Plate VIII. Fig. 10) was rfect and the shrivelled brain lay at the back of the head (Plate VIII. g. 9). The lobes of the brain and some of the convolutions were cognisable, whereas the cerebellum was represented by a crumbling llowish mass of no particular structure. The *medulla oblongata* and e *spinal cord* had completely disappeared. The *spinal dura mater* s perfect.

The *lungs* (Plate VI. Fig. 3) usually lay flat at the back of e pleural cavity. They were jet black, not thicker than a stout ece of cardboard, and traces of adhesions were frequently found. metimes these organs were retracted, and pressed against the side the chest wall; they had shrunk to a length of about 6 inches, d measured not more than half an inch in thickness. Nevertheless, e bronchi were recognisable with the microscope, and the alveolar ucture of the organ could be made out. The alveoli, of course, re less than one-fifth the size of normal, and the whole micro-pical structure had what might be described as a Lilliputian pearance. The lymphatic glands of the chest could not be found a rule.

The *heart* (Plate VI. Fig. 3) was usually represented by a tube-like, low, crumbling mass. The striated fibres were easily demonstrated, d, in some cases, even the valves were seen. On the whole, how-er, this viscus was badly preserved, and its examination disappointing.

The whole mass of the *intestines*, shrivelled up to an almost redible degree, often came away with the abdominal wall. By propriate treatment fairly large pieces of intestine (12 inches in gth) were obtained, but in spite of every possible care, I seldom monstrated greater lengths of the intestinal canal. Under the croscope, the coats of the intestine were visible; and though the umnar epithelium lining of the mucous membrane had disappeared, glands were in a remarkably fine state of preservation, except t the epithelium cells had run together. With hæmatoxylin, the thelium cells stained yellow, and the connective tissue was of a utiful blue.

A remarkable fact was that in three bodies the *rectum* was rmously distended by a brown mass, consisting almost entirely of getable fibres, which the botanist, to whom I showed them, and I re unable to identify. This vegetable material was mixed with a wnish, thick substance, probably fæces, which dissolved easily in

water, carbonate of soda and alcohol. Prolapse of the rectum w seen in two cases (Plate V. Fig. 1). I have found similar masses vegetable fibres in a dried body of the XIIth Dynasty, and in a boy the Greek period (Plate VI. Fig. 4). In the latter, the intesti formed a large lump in the left iliac fossa, the sigmoid flexure bei enormously distended. I cannot help thinking that the vegetal matter had been introduced either by mouth or anus during the l illness for some therapeutic purpose.

The *liver* (Plate VII. Fig 8), dried up almost into the shape of tube, was in position in the right flank. The gall bladder was unrec nisable. The liver measured about 16 to 17 cms. in length, 8 cms. thickness, and weighed 180 grms. on an average. Its substance, the first few millimetres near the surface, was rather soft, black, a sticky, and became hard, crumbling, and of a dirty yellow colour in t deeper regions. The cut surface was more or less granular, and wh exposed to air soon became black, soft, and sticky. In an appropri solution, small pieces, though they never swelled up to any exte softened considerably, and, after a time, became converted into yellowish, sticky, gummy mass, which, when hardened in absol alcohol, could be cut in the usual manner with the microtome.

The microscopical appearance varied considerably. In some ca long strands of homogeneous material only were seen, in which structure could be made out. Sometimes, on the contrary, the c were distinct. They measured about one-third of their usual s were round or irregular in shape, and did not stain except w powerful aniline stains. Not unfrequently, the nuclei were distinct the centre of the cells, and looked like vacuoles. Very often, lobular arrangement of the organ was preserved even when connective tissue, smaller blood vessels, and bile-ducts had complet disappeared. Only the larger vessels and the liver cells were l and they, together with the thicker strands of connective tissue, stai deeply with hæmatoxylin.

The *spleen* (Plate VII. Fig. 5), intensely dark in colour, was always found, in spite of laborious searching. It measured as a r 6 cms. in length, 4 cms. in breadth, and 2 cms. in thickness. Mi scopically very little except strands of connective tissue could recognised.

The *kidneys* (Plate VII. Fig. 7) were flat, 1 cm. thick, 10 c long, 3 cms. broad, and weighed 10 grms. each. They were discove easily. Microscopically the tubuli, connective tissue, and glome were demonstrable, though of course they were greatly altered.

The *ovaries*, *uterus*, and *suprarenal capsules* were not seen, nor it possible, as a rule, to separate the bladder from the surround connective tissue.

The *testicles* were in a very bad state of preservation; all the inte structure, except the thick connective tissue septa, having disappea

The *arteries*, *nerves*, and *muscles* were quite distinct. In two aortæ, ell-marked calcareous plates were found.

A point to be remembered is that all the histological elements had runk greatly; and it is impossible to lay down a rule as to the nount of this shrinkage. Usually, they were about one-third, and ver more than half their natural size, so that it was necessary to ork with much higher powers of the microscope than usual. The ctions, in spite of numerous washings, always remained stained ownish-yellow.

The *bones*, though hard and well preserved, stood maceration rather dly, and care had to be taken not to leave them in water too ng. The *cartilages*, always stained intensely black, were perfect, and, ter maceration in dilute caustic potash, could be removed whole.

Altogether sixteen Coptic bodies were examined, namely, six men and ten adult men. Of the six women, two were young girls rtainly not more than sixteen years old. They showed no patho-gical lesions.

Lesions of the Teeth.

The general appearance of the teeth did not suggest that much re had been taken of them, as they were often yellow and covered th tartar. In one case, indeed, the deposit of tartar was truly ormous, being at least 2 mm. thick. Attrition was not marked, d the crowns contrasted with those of predynastic skulls of Egypt, hich are often ground down to the level of the gums. In most cases, wever, serious lesions of the teeth and alveoli were present, and e life of some of these people must have been one of perfect misery, ing to the state of their mouths.

Description of Dental Lesions found.

I. **Adult Man, probably about 45 years old.**

Teeth Missing.[1]—*Maxillæ.*—Right first molar and second premolar; left st molar. *Mandible.*—Right second premolar and first molar; left first lar. Teeth not much worn, with exception of left third lower molar. wer left second premolar *carious* on posterior approximate side.

II. **Adult, but not old.**—Basilar suture ossified, other sutures still open.

Teeth Missing.—*Maxillæ.*—Left first molar and probably first premolar o. *Mandible.*—Third molar.

Other Lesions of Teeth.—*Maxillæ.*—First right molar extensively ious. In connection with the anterior fang (Plate IX. Fig. 17A), an cess had formed which had perforated through palate into nasal cavity. ack followed by pus evident, and opening into the nasal cavity is nearly the e of threepenny-piece. No perforation into antrum. *Mandible.*—Whole ter wall of alveolus of right first molar has been worn away, evidently by

[1] As teeth often drop out after death, I consider as *missing* only those teeth the alveoli which are completely or almost completely absorbed.

suppuration (Plate IX. Fig. 25). Tooth itself healthy, though crov somewhat worn. Second molar has one fang only, deeply carious. Judgi from size of the alveolus, I conclude that there had been some ulcerati round that fang also.

The dental disease was of old standing, and the third molar had fallen o or been removed some time before death. The floor of the alveolus w partially filled up with bone. The top of it, on the other hand, was near 1·2 cm. wide, and in all probability there had been an abscess round th tooth also. The suppuration had extended backward along the outer side the gums round the second and third molar teeth in the upper maxilla, as t bone in that situation is singularly smooth, and its perfectly rounded edge is sharp contrast with the rugged edge in front. Moreover, the fangs of t teeth are exposed through their whole length owing to the absorption of t alveolar walls.

This man suffered also from chronic nasal disease, from arthritis in t glenoid fossa, from periostitis of the great trochanter of the femur, and chron spondylitis. Racked as he must have been with dental agony, afflicted with chronic nasal discharge, and stiff with pain in his hip and spine, his life mu have been well-nigh unbearable.

III. **Adult Woman, probably about 26 years old.**

Lower third molars present, whereas upper had not emerged.

Teeth Missing.—*Maxillæ* normal. *Mandible.*—Right first molar; l first and third molars.

Other Lesions.—Extensive caries of posterior part of second left mol extending almost to fang. Right second and third right molars extensive carious where they touch. Crowns but little worn.

IV. **Man, adult but not aged, probably about 30 years old.**

Teeth Missing.—*Maxillæ.*—All right premolars and molars. Left seco premolar and third molar. *Mandible.*—Right second molar; left molars a premolars.

Other Lesions. — *Maxillæ.* — Second right incisor, carious. Regi occupied by left first and second molars hollowed out into a cavity with deep pitted floor, measuring 1·5 cm. from before backwards, and 1·2 cm. from si to side. Outer wall of the alveolus of the first molar completely go Evidently there had been extensive suppuration round the first and seco molars, possibly beginning in the teeth themselves. These had either fall out or been removed some time before death. It is highly probable also t there had been an abscess round right canine.

V. **Young Woman**, whose third molars had not emerged yet.

Teeth Missing.—*Mandible.*—Second left premolar; first right mol carious; right middle turbinated bone twice the size of the left.

VI.—**Very old Woman.**—Upper jaw completely smashed after deat probably at the time body was taken out of the grave, so no examination of was possible.

Mandible.—All the teeth with exception of four incisors had disappea long ago, and alveoli had been completely absorbed.

VII. **Man about 45 years old.**—Uncircumcised. All teeth perfe slightly worn.

VIII. **Man advanced in Age.**

Teeth Missing.—*Maxillæ* (right side).—All premolars, first molar, thi molar, second molar present. There had been considerable inflammati round it, so that alveolus is almost completely absorbed. (Left side).—Fi premolar, second premolar, second and third molars. First molar sho the same alteration as the second molar on other side. *Mandible.*—L molars and premolars; right second and third molars. There is some attriti of all the teeth.

IX. **Old Woman.**—All teeth in upper jaw missing (Plate IX. Fig. 15). *Mandible* (right).—Molars, premolars, canine and one incisor. (Left).—Central incisor, canine, second premolar, and all molars.

Alveolar and other Lesions.

Perhaps the most striking changes are the signs of periodontitis and suppuration round the roots of the teeth, which were present in a large number of skulls.

Let us examine, for instance, Plate IX. Fig. 25, and Plate IX. Fig. 27, which come from the same body. Though the teeth are regularly planted, the fangs throughout their whole length are almost bare. This exposure is due to the absorption of the wall of the alveoli; a change generally most marked on the labial border of the teeth. In Plate IX. Fig. 25, for instance, it is evident that suppuration had existed round the molar teeth, which were finally contained in a smooth walled cavity, the walls of which had been completely absorbed. Further, this process of absorption, though less complete, has proceeded along the alveolar borders of the upper maxillæ and mandible, leaving the teeth bare and, for the most part, very loose. In my opinion we are here in the presence of the pathological lesions produced by suppurating disease of the alveoli or pyorrhœa alveolaris.

Another mandible is very interesting from this point of view (Plate IX. Fig. 18). At *a* the alveolus has been completely absorbed, a thin bridge of bone superiorly being all that remains of it. At *c* the bony alveolus has almost disappeared, only the thinnest possible layer of bone remaining. The pus had evidently burrowed into the deeper parts of the mandible. The alveolus itself is of normal size, and the tooth must have dropped out either just before, or possibly after, death. In the neighbouring teeth the same process had been going on, for the fangs are partly bare, and at *b* a sinus has been formed. Without doubt that tooth was on the point of dropping out. It is very probable, if not absolutely certain, that the loss of the other teeth was due to this process also.

The upper jaws of the same skull are completely edentulous and had been so for some time before death, for the alveoli have been absorbed so completely that not a trace of them is left. The suppurating process therefore had attacked the whole mouth, and had lasted for years before the patient finally succumbed.

In another skull one of the teeth was on the point of being shed, one fang being completely, and the other almost completely, bare, so that the tooth was fixed to the skull by one fang only and by the centre of the tooth between the fangs (Plate X. Fig. 29).

As a rule, the teeth in the neighbourhood were perfectly sound, and not carious. In a few cases, however, a certain amount of odontitis had taken place and calculi had formed on the outer surface of the

teeth. Sometimes, on the contrary, absorption of the tooth round the neck had taken place (Plate IX. Fig. 18).

The alveoli were gradually absorbed, and this absorption appears to have started from the bottom and gradually worked its way towards the neck of the tooth, so that after a time, in the molar region for instance, the fangs were laid completely bare, and the teeth were fixed not by the fangs at all, but by the centre between the fangs.

Altogether, therefore, the disease was characterised in Coptic times as it is now, by—(1) Loosening of the teeth; (2) absorption of the alveoli; (3) formation of fistulæ.

Transverse striation of the teeth was very evident in one person (Plate IX. Fig. 20). The cause of it could not be ascertained.

Osseous Lesions.

Adult man, but not aged; probably about 30 years old.

Spondylitis limited to the First Five Cervical Vertebræ.—*Atlas.*—Slight thickening of bone on the anterior arch cavity for odontoid process. *Axis* normal, except that top of odontoid process is covered by a little cap of new bone, measuring 3 × 3 mm. *Third cervical vertebra.*—Upper surface normal. Left inferior articular surface slightly enlarged; right articular surface greatly enlarged, measuring 1·5 cm. × 1·3 cm. Deposit of new bone all round the edge, and surface has a worm-eaten appearance.

Right upper articulating surface and left lower articulating surface of the fourth cervical vertebra and corresponding superior articulating surface of the fifth greatly enlarged, with a worm-eaten appearance.

Lower articulating surface of the fifth cervical vertebra and rest of the vertebral column normal.

Although the characteristic lesions of spondylitis are in this case rather slight, and limited to one side of the cervical part of the vertebral column, the man must have had a very stiff neck, causing great limitation of movement.

Arthritic and Other Lesions in the same Person. This person is one in whom very severe dental disease was present (II.). He was an adult, but by no means an old man.

Glenoid fossæ.—Anterior part of the glenoid fossa is much thickened and partly eburnated. On right side there is considerable thickening of bone forming an irregular patch, measuring 2 cms. × 1·2 cm., with a thickness of 0·2 cm. It extends posteriorly almost to bottom of the fossa. Condyles of mandible are normal.

Pathological changes in vertebral column merely consist in some overlipping of anterior inferior border of the second and the anterior superior border of the third cervical vertebræ. Similar changes are seen in sixth and seventh cervical vertebræ, in dorsal vertebræ from the seventh to the twelfth, and in lumbar vertebræ from first to fourth. Disease is most marked in dorsal region, where new bone forms a thick irregular festoon round anterior border. Last lumbar vertebræ, sacrum, and coccyx normal.

Pelvis shows no change, except for some distinct thickening round lower border of cetabulum.

Right nostril of the same mummy shows a curious appearance (Plate IX. Fig. 12). The middle turbinated bone on that side is conspicuously swollen, its free extremity being about four times as thick as that of its fellow. Swelling gradually tapers towards the attached border and occupies only anterior two-thirds of the bone, posterior third being practically normal.

This swelling had deflected the bony nasal septum very markedly to the ft, and this is also perforated by numerous small holes, which, however, ay have been formed post-mortem.

Left middle turbinated bone had a very ragged edge, but is not noticeably vollen. Both inferior turbinated bones are practically normal.

Left femur.—Thick mass of new bone fills up cavity for the ligamentum eres almost entirely, and projects over borders of cavity especially on the ner side. New bone measures 2·5 cm. × 1·5 cm. (Plate X. Fig. 30). Great ochanter is covered by a somewhat thick deposit of rough new bone. Lower nd of femur would be normal were it not for a patch of spongy new bone bout 1 mm. in thickness and the size of a threepenny bit on the lower and inner rface of the articulation, and some thickening on inner and outer borders of ondyles.

The *right femur* (Plate X. Fig. 30) shows similar changes, especially in avity of ligamentum teres. New bone in this position measures 2 cms. in its ngest and 1·5 in its broadest diameter. There is some slight thickening ound the edge of the lower end of the femur. A distinct rough fitted groove eparates the new bone from the old, and the whole gives the impression of a hronic process. On the other side there is a similar mass 2 cms. long, 1 cm. road, and 4 mm. thick on the upper border near the tip, which is somewhat ough, though otherwise normal.

Spondylitis Deformans (IV.).

Very muscular man. All insertions of muscles extremely prominent. The nsiform cartilage shows a curious defect in ossification (Plate IX. Fig. 13).

Cervical Vertebræ.—*Atlas.*—Formation of new bone round superior order of notch, so that top of the odontoid process is overlapped by bone rowing from atlas.

Lower articular facets of third vertebra greatly enlarged, especially on right ide, where they are rough and irregular, with a thin layer of new bone on inner order. Upper articular facets of fourth cervical correspondingly enlarged, specially right, which measures 2 cms., from above downwards. All other ervical vertebræ have bifid spinous processes, though otherwise normal.

Third dorsal vertebra has a strong anterior median ridge of bone projecting or about 1·2 cm., corresponding to a similar ridge on fourth.

Similar lesions on the sixth, seventh, eighth, and ninth dorsal vertebræ. Lesions specially marked on eighth and ninth dorsal vertebræ, where the corresponding ridges form a lateral prolongation, 1 cm. broad at the base and which projects for 1·2 cm. externally.

Lesions of Vertebral Column, Phalanges, Fibula and Patellæ (III.).

Marked overlipping of anterior borders of bodies of twelfth vertebræ and ll lumbar vertebræ.

Terminal phalanges of feet and hands (Plate IX. Figs. 21, 22, and 23) rough nd thickened at proximal and distal ends, especially at point of insertion of great flexor muscles, and one has the impression that this person suffered from hronic synovitis. In both great toes (Plate IX. Figs. 22 and 23) the point of nsertion of the flexor longus hallucis is greatly deepened and surrounded by a idge of strong new bone (Plate XI. Figs. 22, 23A). Moreover, the proximal nds of both halluces present marked exostoses (Plate IX. Figs. 22 and 23). The distal ends of all the phalanges of hands and feet are exceedingly rough, s if they had been worn away by prolonged inflammation.

Scapulæ.—A mass of strong new bone has formed at the tip and upper border of the right acromion (Plate X. Fig. 28). This extends for a length of 3 cms., and has an irregular upper border with a maximum width of 1·3 cm.

Fibula.—Ossification of lateral ligaments (Plate IX. Fig. 11).
Patellæ.—Ossification of lateral ligaments.

Lesions of Phalanges and Localised Spondylitis Deformans (XII.).

Terminal phalanges of both big toes show same changes as the preceding case. Eleventh and twelfth dorsal vertebræ show prolongation of bone on anterior border = localised spondylitis deformans.

Moreover, upper articular surface for rib of twelfth dorsal (Plate IX. Fig. 19A) enormously enlarged, white, ivory-like, corresponding to similar facet on rib (Plate IX. Fig. 16A).

Exostosis of Pelvis and other Lesions (VIII.).

Male.—*Skull.*—All sutures well advanced in ossification.

Pelvis.—Plate IX. Fig. 24, and Plate X. Fig. 27, give very good pictures of a remarkable exostosis of that bone. The dimensions of this exostosis are as follows: Length = 5 cms.; thickness at tip = 2·25 cms.; depth at B = 2 cms.; depth at A = 0·5 cm.; base = 4 cms. Exostosis is smooth, though deeply grooved at B and C, as if by blood vessels. There are no signs of inflammation in neighbouring bones, and symphysis is quite normal.

Last lumbar vertebra shows signs of inflammation (Plate X. Fig. 26A), and there is some slight thickening round the anatomical necks in the humeri.

On left fibula there is a sharp transverse cut, about 1 cm. long, and less than 1 cm. deep. No scar of skin noticeable, but this may be due to the very bad state of the teguments.

Injuries.

The only injuries discovered were the transverse cut on the fibula, mentioned afterwards, and a healed fractured rib shown in Plate IX. Fig. 14.

Lesions of Soft Parts.

Hypertrophy of Spleen.—In order to ascertain whether the organs were enlarged or the reverse, their average weight had to be ascertained. I give here, therefore, the weights and lengths of the spleen, liver, and kidneys of five Coptic bodies, and compare them with the average weight of the same organs in adults of the present time.

	Weight.		Length.		Breadth.
	Coptic.	Present Day.	Coptic.	Present Day.	Coptic.
Liver . . .	180 grms.	1609 grms.	165 cms.	321 cms.	8 cms.
Spleen . .	12 ,,	171 ,,	6 ,,	12–13	4 ,,
Kidneys . .	10 ,,	140 ,,	10 ,,	10, 8–11, 4	3 ,,

These Coptic weights correspond closely with those of the same organs of a dried body of the XIIth Dynasty. Roughly speaking, the organs weigh in Coptic bodies about one-tenth to one-fifteenth of their original weight. The

ength of the liver and spleen of Coptic bodies is diminished by about one-half, whereas the kidneys retain very nearly their normal length.

One spleen, however, instead of weighing 12 grms., weighed 27 grms., that s, nearly double the weight of the normal. It measured 20 mm. in length nore than the normal spleen. The weight of the liver of the same person was 186 grms.—that is, a little greater than normal. In this case, therefore, we nave evidence that there was during life some hypertrophy of the spleen.

The second case (XII.) was still more interesting. The dimensions of the spleen (Plate VII. Fig. 6) were :—

Length, 16 cms.; weight, 62 grms.; breadth, 8 cms.—that is, the spleen was at least twice as long, twice as broad, and weighed five times as much as the normal spleen of Coptic bodies. In the photograph the breadth is not seen, because the spleen was bent on itself; an appearance which, owing to the uniform blackness, could not be brought out in the photograph. The liver also was distinctly larger than normal, as it weighed 280 instead of 180 grms.

Microscopical examination threw no light on the causation of the enlargement of the volume of these organs, for an enormous growth of moulds completely obscured the structure of the organ.

To speculate on the actual cause of this hypertrophy would be useless. Malaria was most probably the cause of it, and this hypothesis is supported by the fact that up to the present day it is not a rare disease in Upper Egypt where these people lived.

I may mention, in this connection, that I found a similarly enlarged spleen in a Fayoum mummy, dating from the Roman period. The Fayoum Province is, even now, infested with malaria.

Summary.

Already in several papers I have drawn attention to the bad state of the teeth of ancient Egyptians.

It would be difficult, however, to find anywhere so many diseased teeth as in these Coptic bodies. Practically every skull, with the exception of two,[1] had some serious dental defects. This may perhaps be accounted for by the fact that very little care of the dentition appears to have been taken. The thick incrustations of tartar are sufficient evidence that the Copts did not clean their teeth at all. In many peoples and animals, the absence of the tooth-brush is compensated for by the fact that the food is hard, fibrous, and raw, requiring a good deal of chewing, which mechanically cleans the teeth. In ancient Coptic times this does not appear to have been the case, for, in contrast to the predynastic bodies in which attrition is very marked, this is slight, in fact being less marked than it is in Egyptians of the present day.

It would appear, therefore, that the Copts of Antinoë, lived chiefly on cooked, soft food, chewed without an effort. Caries, moreover, was extremely common, and was possibly due to the nature of the food consumed.

The fact that many of these people suffered from periodontitis and

[1] I do not give a detailed account of five skulls which were given to a foreign museum. As the mouths were not opened in order not to spoil them, I cannot say for certain how many teeth were bad, but I ascertained that all of them had diseased teeth.

pyorrhœa alveolaris[1] may perhaps have been due to small particles of food lodging between the teeth and setting up putrefaction, inflammation, and suppuration. In Alexandria, at the present time, the poorer class of natives take very little care of the teeth, and it is perhaps owing to this fact that periodontitis and pyorrhœa alveolaris are exceedingly common among them. My friend, Mr. Webb-Jones, surgeon to the Government Hospital, tells me that it occurs in almost every patient frequenting this hospital. Many Europeans suffer from it also.

Lastly, I found no certain evidence that these people knew anything about dentistry. Surely had the practice of even simple tooth-drawing been common, such lesions as I have described, and the accompanying excruciating pain, would have been avoided by this very simple operation.

The occurrence of spondylitis deformans among ancient Copts is one more proof that the disease has existed throughout Egypt from the remotest times and is independent of climate. It has been found by Dr. Rietti and myself in bodies buried close to the Mediterranean shores, in bodies from Upper Egypt and in Nubia. Quite lately, I have found an example of it in a skeleton from the Meroïtic Kingdom (300 B.C.) and buried in the Tropics at Merawi, one of the hottest and dryest places in the world, and others in Christian skeletons at Abou Menas and Abou Sir in the comparatively damp region of Mariout. These skeletons date from about 500 A.D.

A peculiarity of the disease met with in Coptic bodies is that it was as a rule localised to few vertebræ, and, in one case, to two vertebræ and one rib.

The exostosis of the pelvis and the inflammatory lesions described in various parts of the skeleton call for no particular comment.

The arthritis of the tempero-maxillary condition described in this paper was a rare disease among Egyptians, for I do not possess another specimen.

Cases of hypertrophy of the middle turbinated bones in ancient peoples have not been described before, as far as I know. Since writing this paper, however, I have seen another Egyptian skull dating from about 1000 B.C., in which the nasal passages on both sides were completely blocked by hypertrophy of the turbinated bones, and I have also found similar unilateral lesions in two Greek skulls dating from the time of Alexander the Great.

Pathological changes of the soft parts, recognisable macroscopically, were not common. Judging from the two cases of hypertrophied spleen which were found, it appears probable that these people suffered from *malaria*, but nothing definite can be said until a large number of bodies coming from the same locality have been examined.

[1] The disease is almost as old as the human race. At any rate, I have found evidence of it in prehistoric skulls and in Greek, Roman, Peruvian, Mexican, Merovingian, and German skulls.

DESCRIPTION OF PLATES V.–X. (For particulars see text.)

Plate V.

Fig. 1.—Coptic body with prolapse of rectum. The body, with the exception of the head and feet, was dressed in a long linen shirt. Notice that the parts not covered by the shirt have remained white.

Fig. 2.—Body with (*a*) deep abscess in back.

Plate VI.

Fig. 3.—Lungs and heart stained intensely black.

Fig. 4.—Distended rectum and sigmoid flexure.

Plate VII.

Fig. 5.—Normal spleen.

Fig. 6.—Hypertrophied spleen.

Fig. 7.—Kidney.

Fig. 8.—Liver.

Plate VIII.

Fig. 9.—Skull with cap removed. D.M. = Dura mater. Part of the brain visible *in situ*.

Fig. 10.—Skull showing falx cerebri *in situ*.

Plate IX.

Fig. 11.—Fibula. Ossification of lateral ligament.

Fig. 12.—Hypertrophied middle turbinated bone.

Fig. 13.—Defect of ossification in sternum.

Fig. 14.—Fractured rib.

Fig. 15.—Edentulous upper jaw. The loss of teeth was probably due to pyorrhœa alveolaris, as the corresponding mandible showed all the lesions of that disease.

Fig. 16.—Rib with articular facet (A) greatly enlarged and eburnated.

Fig. 17.—From the same skull as Fig. 25. The first molar (A) is extensively decayed and a sinus leads from it into the nasal cavity.

Fig. 18.—Pyorrhœa alveolaris. At *a*, the tooth has fallen out, and the alveolus has been completely absorbed, except for a thin ridge of bone at the superior border. At *c*, the alveolus has been almost completely absorbed. The alveolus of the neighbouring outer tooth has been almost completely absorbed so that the fang is nearly bare, and at *b* a sinus has formed. There has been absorption round the neck of that tooth also.

Fig. 19.—Dorsal vertebra with (*a*) an eburnated, enlarged facet for articulation with rib. The lower anterior border of body presents a marked exostosis (*f*).

Fig. 20.—Teeth with marked transverse striation.

Fig. 21.—Terminal phalanx. There is considerable formation of new bone round insertion of flexor digitorum profundus. The ungual extremity is very rough.

Fig. 22.—Hallux with exostosis due to chronic inflammation. At A an osseous ridge round insertion of long flexor (tight boots?). The ungual end is greatly roughened and has a worm-eaten appearance.

Fig. 23.—Similar to Fig. 22.

Fig. 24.—Exostosis of pelvis. *A* points to groove in exostosis.

Fig. 25.—Pyorrhœa alveolaris. The second lower molar is extensively decayed. (See al Plate IX. Fig. 17.)

Plate X.

Fig. 26.—Last lumbar vertebra. Thickening of anterior border of body with mark absorption of bone at A.

Fig. 27.—Exostosis of pelvis (see also Plate IX. Fig. 24). A, B, and C point to de grooves in exostosis.

Fig. 28.—Exostosis at tip of acromion.

Fig. 29.—Pyorrhœa alveolaris. The alveoli of the third molar have been complete absorbed, the tooth being attached by its centre only.

Fig. 30.—Marked periostitis over great trochanter.

(Most of the photographs by Dr. Rietti.)

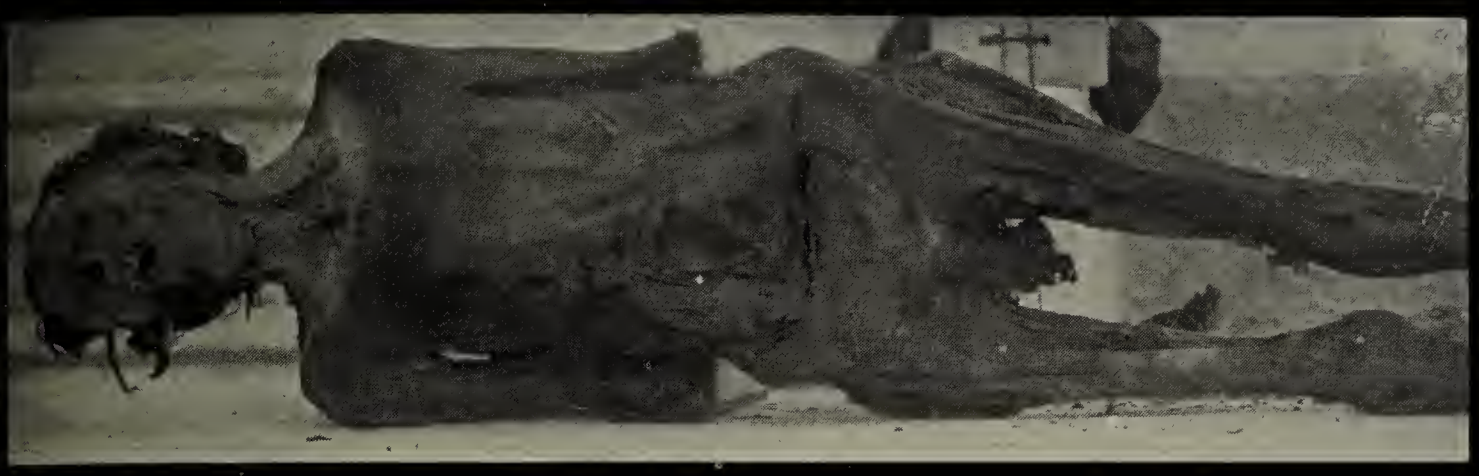

FIG. 1

FIG. 2

FIG. 3

FIG. 4

G. 5

FIG. 6

FIG. 7

FIG. 8.

FIG. 9

FIG. 10

11

12

13

14

15

16

A

A

17

a

b

c

18

a

19

f

20

21

22

A

23

A

24

A

25

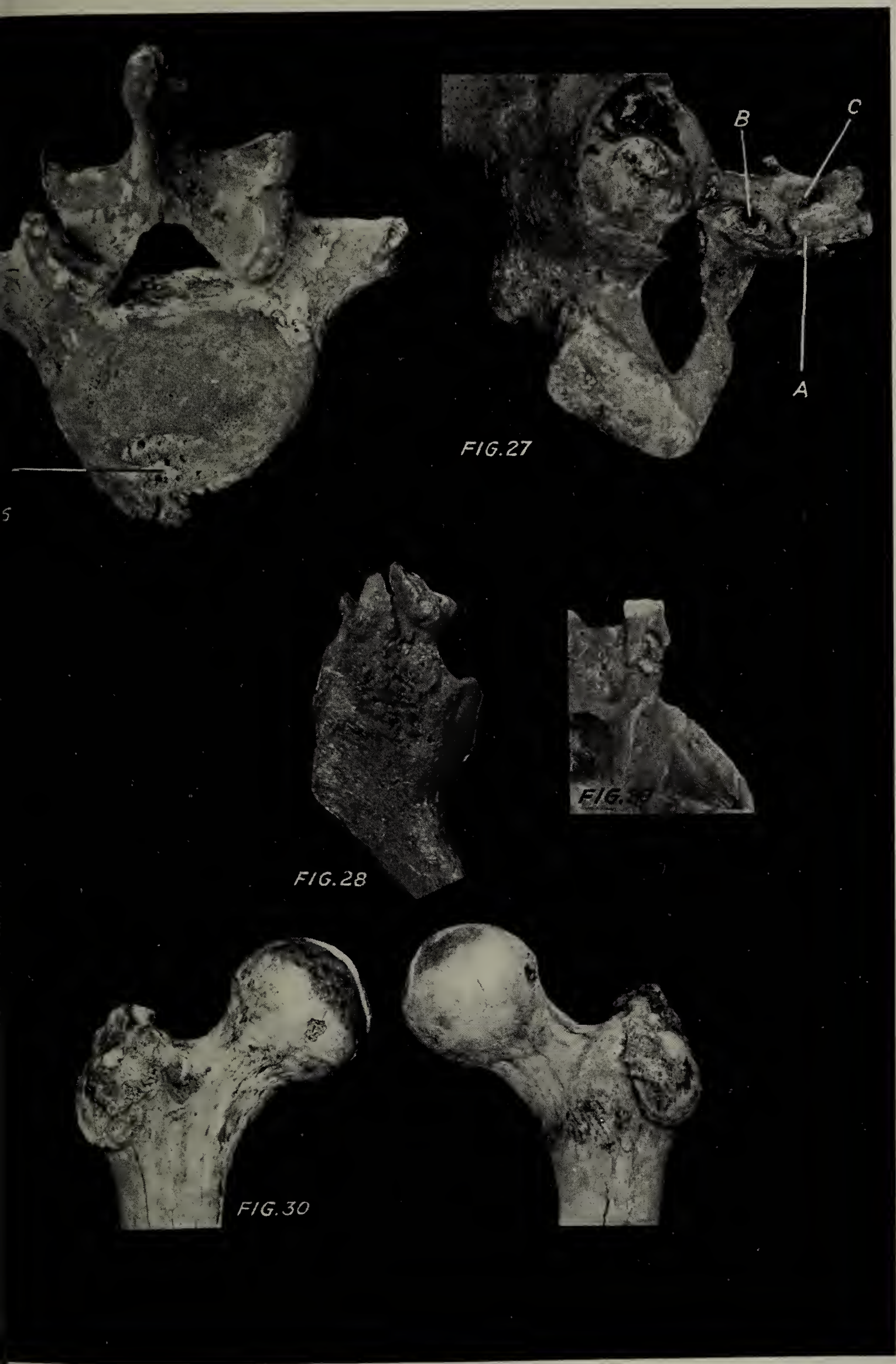

FIG. 27

FIG. 28

FIG. 29

FIG. 30